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Inventors	: Taiichi Okada	Docket No.: TIP-04-1178
	: Isoo Saito	
Title	: COATED BASE FABRIC FOR	Confirmation No.: 2464
	: AIRBAG AND METHOD FOR	
	: MANUFACTURING THE SAME	

Declaration of Taiichi Okada Under C.F.R. §1.132

Commissioner for Patents
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Sir:

I, Taiichi Okada, declare that I reside at Aichi, Japan, I am the inventor named in the above-identified U.S. Patent Application, I have for eleven years been employed by Toray Industries and I am familiar with the art relating to producing yarns and fabrics for airbags.

I studied the cited references in this Application and provide some Experiments to distinguish the claimed subject matter over JP 07-252740 A.

The Experiments are described below and the results shown in the following Table:

EXPERIMENTS

TEST METHOD

Samples:

A : Nylon 66 fibers, 470 dtex and 144 filaments, were produced in the same manner as in Example 5 in the above-identified U.S. Patent Application, except that the number of entanglements was 17/m.

Next, using the resulting nylon 66 fibers, base fabric for airbags was fabricated in the same manner as in Example 5 in the above-identified U.S. Patent Application.

B : Nylon 66 fibers, 470 dtex and 144 filaments, were produced in the same manner as in Example 5 in the above-identified U.S. Patent Application, except that the number of entanglements was 28/m.

Next, using the resulting nylon 66 fibers, base fabric for airbags was fabricated in the same manner as in Example 5 in the above-identified U.S. Patent Application.

C : Nylon 66 fibers, 470 dtex and 144 filaments, were produced in the same manner as in Example 5 in the above-identified U.S. Patent Application, except that the number of entanglements was 17/m.

Next, using the resulting nylon 66 fibers, base fabric for airbags was fabricated in the same manner as in Example 5 in the above-identified U.S. Patent Application, except that the max tensioning in the warping and wefting was respectively 0.2 and 0.15 cN/dtex.

MEASUREMENT

(1) The number of entanglements in the filaments of the yarns:

According to a water-dipping method, the number of entanglements points that have length of at least 1 mm of a sample is measured, and the number thereof per m of the sample is derived from it. Ten yarns are analyzed, and their data are averaged.

The water bath has a length of 70 cm, a width of 15 cm and a depth of 5 cm. This is partitioned at 10 cm from each end in the longitudinal direction, and filled with pure water. Yarn samples are dipped in it, and the number of entanglements of each sample is measured. To remove the influence of impurities such as oil on the measurement, the pure water in the bath is exchanged for fresh one in every measurement.

(2) The number of entanglements in the filaments of the yarns in base fabric:

A base fabric to be analyzed is decomposed, and 10 warp yarns and 110 weft yarns are sampled. These samples are analyzed for the number of the entanglements therein, according to the same water-dipping method as above. The data of the ten samples are averaged separately for the warp and the weft.

(3) Thickness of fabric:
Measured according to the method of JIS L1096(6.5).

(4) Bending resistance(Degree of Stiffness):
Measured according to the method of JIS L1096(6.19.1 A method).

(5) Thickness of airbag:

The base fabric produced is fabricated into an airbag of a volume of 60 liters mentioned below. This is bellows-wise folded from the right and left directions each into four, and then from the top and bottom directions each into four to give an extent of 150×150 mm. A load of 4000 g is applied to the thus-folded bag, and the thickness of the back in that condition is measured.

RESULTS

Table

		A	B	C
Properties of Yarns	total fineness (dtex)	470	470	470
	number of filaments (filament)	144	144	144
	filament fineness (dtex)	3.2	3.2	3.2
	cross-section profile	Flat	Flat	Flat
	degree of flatness (-)	3.5	3.5	3.5
	tenacity (cN/dtex)	7.7	7.6	7.7
	Elongation (%)	21	21	21
	boiling water shrinkage (%)	6.2	6.3	6.2
	number of entanglements (/m)	17	28	17
	number of entanglements in fabric (/m)	0	5	5
Design and Properties of Fabrics	texture density of warp (/2.54 cm)	48	48	48
	texture density of weft (/2.54 cm)	48	48	48
	cover factor (-)	1967	1967	1967
	warp tension max (cN/dtex)	0.55	0.55	0.2
	weft tension max (cN/dtex)	0.32	0.32	0.15
	Scouring	No	No	No
	Calendaring	No	No	No
	Horizontal index warp cross-section (-)	0.96	0.72	0.68
	weft cross-section (-)	0.90	0.73	0.62
	tensile strength (N/cm)	625	608	612
	tear strength (N)	267	156	151
	air permeability (cc/sec/cm^2)	0	0	0
	thickness of fabric (mm)	0.26	0.31	0.32
	bending resistance (mm)	75	101	110
	adhered resin amount (g/m)	15	15	15
	thickness of airbag (mm)	26	32	34

We could obtain the base fabric A for airbags having the same properties of the fabric of Example 5 in the above-identified U.S. Patent Application substantially that Horizontal index (warp cross-section) is 0.96 and Horizontal index (weft cross-section) is 0.90 and the thickness of the fabric is 0.26 mm and the bending resistance is 75 mm, and the thickness of airbag is 26 mm, since the number of entanglements in the fabric A is 0.

We could also obtain the base fabrics B and C for airbags that Horizontal index (warp cross-section) is respectively 0.72 and 0.68 and Horizontal index (weft cross-section) is respectively 0.73 and 0.62 and the thickness of the fabric is respectively 0.31 and 0.32 mm and the bending resistance is respectively 101 and 110 mm, and the thickness of airbag is respectively 32 and 34 mm, since the number of entanglements in the both fabrics is 5/m.

Conclusion

The above results taught us that we could obtain the base fabrics for airbags that were thin and flexible and having good contain-ability, when we used nylon 66 fibers having the flattened cross-section yarns whose number of entanglements in the fabric was at most 3/m.

The undersigned declares that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and thus such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: September 05, 2008 Taiichi Okada

Taiichi Okada